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<110> Nelson, Edward L.
Nelson, Peter J.

<120> A VECTOR FOR POLYNUCLEOTIDE VACCINES

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ccctggactg ttgaacgagg tcggcgtaga cggtctgacg acacgcaaac tggcggaacg 180

gttgggggtg cagcagccgg cgctttactg gcacttcagg aacaagcggg cgccttaagg 240

gccatatggt gagtggatgc cttgacccca ggcggggatg ggggagacct gtagtcagag 300

cccccgggca gcacaggcca atgcccgtcc ttcccctgca ggatgagtag tgagtgcctc 360

tcctggccct ggaagttgcc actccagtgc ccaccagcct tgtcctaata aaattaagtt 420

gcatcatttt gtctgactag gtgtcctcta taatattata agcttgatat cgaattcttt 480

cggacttttg aaagtgatgg tggtggggga aggattcgaa ccttcgaagt cgatgacggc 540

agatttagag tctgctccct ttggccgctc gggaacccca ccacgggtaa tgcttttact 600

ggcctgctcc cttatcggga agcggggcgc atcatatcaa atgacgcgcc gctgtaaagt 660

gttacgttga gaaagaattc ctgcagcccg ccgcgttgct ggcgtttttc cataggctcc 720

gccccccctga cgagcatcac aaaaatcgac gctcaagtca gaggtggcga aacccgacag 780

gactataaag ataccaggcg tttccccctg gaagctccct cgtgcgctct cctgttccga 840

ccctgccgct taccggatac ctgtccgcct ttctcccttc gggaagcgtg gcgctttctc 900

aatgctcacg ctgtaggtat ctcagttcgg tgtaggtcgt tcgctccaag ctgggctgtg 960

tgcacgaacc ccccgttcag cccgaccgct gcgccttatc cggtaactat cgtcttgagt 1020

ccaacccggt aagacacgac ttatcgccac tggcagcagc cactggtaac aggattagca 1080

gagcgaggta tgtaggcggt gctacagagt tcttgaagtg gtggcctaac tacggctaca 1140

ctagaaggac agtatttggt atctgcgctc tgctgaagcc agttaccttc ggaaaaagag 1200

ttggtagctc ttgatccggc aaacaaacca ccgctggtag cggtggtttt tttgtttgca 1260

agcagcagat tacgcgcaga aaaaaaggat ctgggggatc cggagagctc actctagatg 1320

agagagcagt gagggagaga cagagactcg aatttccgga gctatttcag ttttcttttc 1380

cgttttgtgc aatttcactt atgataccgg ccaatgcttg gttgctattt tggaaactcc 1440

ccttagggga tgcccctcaa ctggccctat aaagggccag cctgagctgc agaggattcc 1500

tgcagaggat caagacagca cgtggacctc gcacagcctc tcccaca 1547

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<213> Artificial

<220>
<223> Synthetic

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ccctggactg ttgaacgagg tcggcgtaga cggtctgacg acacgcaaac tggcggaacg 180

gttgggggtg cagcagccgg cgctttactg gcacttcagg aacaagcggg cgccttaagg 240

gccatatggt gagtggatgc cttgacccca ggcggggatg ggggagacct gtagtcagag 300

cccccgggca gcacaggcca atgcccgtcc ttcccctgca ggatgagtag tgagtgcctc 360

tcctggccct ggaagttgcc actccagtgc ccaccagcct tgtcctaata aaattaagtt 420

gcatcatttt gtctgactag gtgtcctcta taatattata agcttgatat cgaattcttt 480

cggacttttg aaagtgatgg tggtggggga aggattcgaa ccttcgaagt cgatgacggc 540

agatttagag tctgctccct ttggccgctc gggaacccca ccacgggtaa tgcttttact 600

ggcctgctcc cttatcggga agcggggcgc atcatatcaa atgacgcgcc gctgtaaagt 660

gttacgttga gaaagaattc ctgcagcccg ccgcgttgct ggcgtttttc cataggctcc 720

gccccccctga cgagcatcac aaaaatcgac gctcaagtca gaggtggcga aacccgacag 780

gactataaag ataccaggcg tttccccctg gaagctccct cgtgcgctct cctgttccga 840

ccctgccgct taccggatac ctgtccgcct ttctcccttc gggaagcgtg gcgctttctc 900

aatgctcacg ctgtaggtat ctcagttcgg tgtaggtcgt tcgctccaag ctgggctgtg 960

tgcacgaacc ccccgttcag cccgaccgct gcgccttatc cggtaactat cgtcttgagt 1020

ccaacccggt aagacacgac ttatcgccac tggcagcagc cactggtaac aggattagca 1080

gagcgaggta tgtaggcggt gctacagagt tcttgaagtg gtggcctaac tacggctaca 1140

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ctcagtgact cagtgagtaa taaagactca gtgacttctg atcctgtcct aactgccact 1440

ccttgttgtc ccaagaaagc ggcttcctgc tctctgagga ggacccctcc cctggaaggt 1500

aaaactaagg atgtcagcag agaaattttt ccaccattgg tgcttggtca aagaggaaac 1560

tgatgagctc actctagatg agagagcagt gagggagaga cagagactcg aatttccgga 1620

gctatttcag ttttcttttc cgttttgtgc aatttcactt atgataccgg ccaatgcttg 1680

gttgctattt tggaaactcc ccttagggga tgcccctcaa ctggccctat aaagggccag 1740

cctgagctgc agaggattcc tgcagaggat caagacagca cgtggacctc gcacagcctc 1800

tcccaca 1807

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<212> DNA
<213> Artificial

<220>
<223> Synthetic

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tgccacatac ggaaagctca ccctgaaatt catctgcacc actggaaagc tccctgtgcc 180

atggccaaca ctggtcacta ccttcaccta tggcgtgcag tgcttttcca gatacccaga 240

ccatatgaag cagcatgact ttttcaagag cgccatgccc gagggctatg tgcaggagag 300

aaccatcttt ttcaaagatg acgggaacta caagacccgc gctgaagtca agttcgaagg 360

tgacaccctg gtgaatagaa tcgagttgaa gggcattgac tttaaggaag atggaaacat 420

tctcggccac aagctggaat acaactataa ctcccacaat gtgtacatca tggccgacaa 480

gcaaaagaat ggcatcaagg tcaacttcaa gatcagacac aacattgagg atggatccgt 540

gcagctggcc gaccattatc aacagaacac tccaatcggc gacggccctg tgctcctccc 600

agacaaccat tacctgtcca cccagtctgc cctgtctaaa gatcccaacg aaaagagaga 660

ccacatggtc ctgctggagt ttgtgaccgc tgctgggatc acacatggca tggacgagct 720

gtacaagtga gcgccttaag ggccatatgg tgagtggatg ccttgacccc aggcggggat 780

gggggagacc tgtagtcaga gcccccgggc agcacaggcc aatgcccgtc cttcccctgc 840

aggatgagta gtgagtgcct ctcctggccc tggaagttgc cactccagtg cccaccagcc 900

ttgtcctaat aaaattaagt tgcatcattt tgtctgacta ggtgtcctct ataatattat 960

aagcttgata tcgaattctt tcggactttt gaaagtgatg gtggtggggg aaggattcga 1020

accttcgaag tcgatgacgg cagatttaga gtctgctccc tttggccgct cgggaacccc 1080

accacgggta atgcttttac tggcctgctc ccttatcggg aagcggggcg catcatatca 1140

aatgacgcgc cgctgtaaag tgttacgttg agaaagaatt cctgcagccc gccgcgttgc 1200

tggcgttttt ccataggctc cgccccccctg acgagcatca caaaaatcga cgctcaagtc 1260

agaggtggcg aaacccgaca ggactataaa gataccaggc gtttcccccct ggaagctccc 1320

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cgggaagcgt ggcgctttct caatgctcac gctgtaggta tctcagttcg gtgtaggtcg 1440

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ccggtaacta tcgtcttgag tccaacccgg taagacacga cttatcgcca ctggcagcag 1560

ccactggtaa caggattagc agagcgaggt atgtaggcgg tgctacagag ttcttgaagt 1620

ggtggcctaa ctacggctac actagaagga cagtatttgg tatctgcgct ctgctgaagc 1680

cagttacctt cggaaaaaga gttggtagct cttgatccgg caaacaaacc accgctggta 1740

gcggtggttt ttttgtttgc aagcagcaga ttacgcgcag aaaaaaagga tctgggggat 1800

ccggagagct cccaacgcgt tggatgcatg gatgagggaa aggaggtaag atctgtaatg 1860

aataagcagg aactttgaag actcagtgac tcagtgagta ataaagactc agtgacttct 1920

gatcctgtcc taactgccac tccttgttgt cccaagaaag cggcttcctg ctctctgagg 1980

aggacccctt ccctggaagg taaaactaag gatgtcagca gagaaatttt tccaccattg 2040

gtgcttggtc aaagaggaaa ctgatgagct cactctagat gagagagcag tgagggagag 2100

acagagactc gaatttccgg agctatttca gttttctttt ccgttttgtg caatttcact 2160

tatgataccg gccaatgctt ggttgctatt ttggaaactc cccttagggg atgcccctca 2220

actggcccta taaagggcca gcctgagctg cagaggattc ctgcagagga tcaagacagc 2280

acgtggacct cgcacagcct ctcccaca 2308

<210> 30
<211> 12
<212> DNA
<213> Artificial

<220>
<223> Synthetic

<400> 30
gccaccatgg cc 12

<210> 31
<211> 11
<212> DNA
<213> Artificial

<220>
<223> Synthetic

<400> 31
gccttaaggg c 11

<210> 32
<211> 14
<212> DNA/RNA
<213> Artificial

<220>
<223> Synthetic

<400> 32

gcccgccrcc augg 14

<210> 33
<211> 23
<212> DNA
<213> Artificial

<220>
<223> Synthetic

<400> 33
gccaccatgg cccggtggta ccg 23

<210> 34
<211> 22
<212> DNA
<213> Artificial

<220>
<223> Synthetic

<400> 34
gccttaaggg ccggaattcc cg 22

<210> 35
<211> 1210
<212> PRT
<213> Homo sapiens

<400> 35

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Ala Leu Cys Pro Ala Ser Arg Ala Leu Glu Glu Lys Lys Val Cys Gln
            20                  25                  30

Gly Thr Ser Asn Lys Leu Thr Gln Leu Gly Thr Phe Glu Asp His Phe
        35                  40                  45

Leu Ser Leu Gln Arg Met Phe Asn Asn Cys Glu Val Val Leu Gly Asn
    50                  55                  60

Leu Glu Ile Thr Tyr Val Gln Arg Asn Tyr Asp Leu Ser Phe Leu Lys
65                  70                  75                  80

Thr Ile Gln Glu Val Ala Gly Tyr Val Leu Ile Ala Leu Asn Thr Val
                85                  90                  95

Glu Arg Ile Pro Leu Glu Asn Leu Gln Ile Ile Arg Gly Asn Met Tyr
            100                 105                 110

Tyr Glu Asn Ser Tyr Ala Leu Ala Val Leu Ser Asn Tyr Asp Ala Asn
```

```
        115                 120                 125

Lys Thr Gly Leu Lys Glu Leu Pro Met Arg Asn Leu Gln Glu Ile Leu
    130                 135                 140

His Gly Ala Val Arg Phe Ser Asn Asn Pro Ala Leu Cys Asn Val Glu
145                 150                 155                 160

Ser Ile Gln Trp Arg Asp Ile Val Ser Ser Asp Phe Leu Ser Asn Met
                165                 170                 175

Ser Met Asp Phe Gln Asn His Leu Gly Ser Cys Gln Lys Cys Asp Pro
            180                 185                 190

Ser Cys Pro Asn Gly Ser Cys Trp Gly Ala Gly Glu Glu Asn Cys Gln
        195                 200                 205

Lys Leu Thr Lys Ile Ile Cys Ala Gln Gln Cys Ser Gly Arg Cys Arg
    210                 215                 220

Gly Lys Ser Pro Ser Asp Cys Cys His Asn Gln Cys Ala Ala Gly Cys
225                 230                 235                 240

Thr Gly Pro Arg Glu Ser Asp Cys Leu Val Cys Arg Lys Phe Arg Asp
                245                 250                 255

Glu Ala Thr Cys Lys Asp Thr Cys Pro Pro Leu Met Leu Tyr Asn Pro
            260                 265                 270

Thr Thr Tyr Gln Met Asp Val Asn Pro Glu Gly Lys Tyr Ser Phe Gly
        275                 280                 285

Ala Thr Cys Val Lys Lys Cys Pro Arg Asn Tyr Val Val Thr Asp His
    290                 295                 300

Gly Ser Cys Val Arg Ala Cys Gly Ala Asp Ser Tyr Glu Met Glu Glu
305                 310                 315                 320

Asp Gly Val Arg Lys Cys Lys Lys Cys Glu Gly Pro Cys Arg Lys Val
                325                 330                 335

Cys Asn Gly Ile Gly Ile Gly Glu Phe Lys Asp Ser Leu Ser Ile Asn
            340                 345                 350

Ala Thr Asn Ile Lys His Phe Lys Asn Cys Thr Ser Ile Ser Gly Asp
        355                 360                 365
```

```
Leu His Ile Leu Pro Val Ala Phe Arg Gly Asp Ser Phe Thr His Thr
    370                 375                 380

Pro Pro Leu Asp Pro Gln Glu Leu Asp Ile Leu Lys Thr Val Lys Glu
385                 390                 395                 400

Ile Thr Gly Phe Leu Leu Ile Gln Ala Trp Pro Glu Asn Arg Thr Asp
                405                 410                 415

Leu His Ala Phe Glu Asn Leu Glu Ile Ile Arg Gly Arg Thr Lys Gln
            420                 425                 430

His Gly Gln Phe Ser Leu Ala Val Val Ser Leu Asn Ile Thr Ser Leu
        435                 440                 445

Gly Leu Arg Ser Leu Lys Glu Ile Ser Asp Gly Asp Val Ile Ile Ser
    450                 455                 460

Gly Asn Lys Asn Leu Cys Tyr Ala Asn Thr Ile Asn Trp Lys Lys Leu
465                 470                 475                 480

Phe Gly Thr Ser Gly Gln Lys Thr Lys Ile Ile Ser Asn Arg Gly Glu
                485                 490                 495

Asn Ser Cys Lys Ala Thr Gly Gln Val Cys His Ala Leu Cys Ser Pro
            500                 505                 510

Glu Gly Cys Trp Gly Pro Glu Pro Arg Asp Cys Val Ser Cys Arg Asn
        515                 520                 525

Val Ser Arg Gly Arg Glu Cys Val Asp Lys Cys Asn Leu Leu Glu Gly
    530                 535                 540

Glu Pro Arg Glu Phe Val Glu Asn Ser Glu Cys Ile Gln Cys His Pro
545                 550                 555                 560

Glu Cys Leu Pro Gln Ala Met Asn Ile Thr Cys Thr Gly Arg Gly Pro
                565                 570                 575

Asp Asn Cys Ile Gln Cys Ala His Tyr Ile Asp Gly Pro His Cys Val
            580                 585                 590

Lys Thr Cys Pro Ala Gly Val Met Gly Glu Asn Asn Thr Leu Val Trp
        595                 600                 605

Lys Tyr Ala Asp Ala Gly His Val Cys His Leu Cys His Pro Asn Cys
    610                 615                 620
```

```
Thr Tyr Gly Cys Thr Gly Pro Gly Leu Glu Gly Cys Pro Thr Asn Gly
625                 630                 635                 640

Pro Lys Ile Pro Ser Ile Ala Thr Gly Met Val Gly Ala Leu Leu Leu
                645                 650                 655

Leu Leu Val Val Ala Leu Gly Ile Gly Leu Phe Met Arg Arg Arg His
            660                 665                 670

Ile Val Arg Lys Arg Thr Leu Arg Arg Leu Leu Gln Glu Arg Glu Leu
        675                 680                 685

Val Glu Pro Leu Thr Pro Ser Gly Glu Ala Pro Asn Gln Ala Leu Leu
    690                 695                 700

Arg Ile Leu Lys Glu Thr Glu Phe Lys Lys Ile Lys Val Leu Gly Ser
705                 710                 715                 720

Gly Ala Phe Gly Thr Val Tyr Lys Gly Leu Trp Ile Pro Glu Gly Glu
                725                 730                 735

Lys Val Lys Ile Pro Val Ala Ile Lys Glu Leu Arg Glu Ala Thr Ser
            740                 745                 750

Pro Lys Ala Asn Lys Glu Ile Leu Asp Glu Ala Tyr Val Met Ala Ser
        755                 760                 765

Val Asp Asn Pro His Val Cys Arg Leu Leu Gly Ile Cys Leu Thr Ser
    770                 775                 780

Thr Val Gln Leu Ile Thr Gln Leu Met Pro Phe Gly Cys Leu Leu Asp
785                 790                 795                 800

Tyr Val Arg Glu His Lys Asp Asn Ile Gly Ser Gln Tyr Leu Leu Asn
                805                 810                 815

Trp Cys Val Gln Ile Ala Lys Gly Met Asn Tyr Leu Glu Asp Arg Arg
            820                 825                 830

Leu Val His Arg Asp Leu Ala Ala Arg Asn Val Leu Val Lys Thr Pro
        835                 840                 845

Gln His Val Lys Ile Thr Asp Phe Gly Leu Ala Lys Leu Leu Gly Ala
    850                 855                 860

Glu Glu Lys Glu Tyr His Ala Glu Gly Gly Lys Val Pro Ile Lys Trp
865                 870                 875                 880
```

```
Met Ala Leu Glu Ser Ile Leu His Arg Ile Tyr Thr His Gln Ser Asp
                885                 890                 895

Val Trp Ser Tyr Gly Val Thr Val Trp Glu Leu Met Thr Phe Gly Ser
            900                 905                 910

Lys Pro Tyr Asp Gly Ile Pro Ala Ser Glu Ile Ser Ser Ile Leu Glu
        915                 920                 925

Lys Gly Glu Arg Leu Pro Gln Pro Pro Ile Cys Thr Ile Asp Val Tyr
    930                 935                 940

Met Ile Met Val Lys Cys Trp Met Ile Asp Ala Asp Ser Arg Pro Lys
945                 950                 955                 960

Phe Arg Glu Leu Ile Ile Glu Phe Ser Lys Met Ala Arg Asp Pro Gln
                965                 970                 975

Arg Tyr Leu Val Ile Gln Gly Asp Glu Arg Met His Leu Pro Ser Pro
            980                 985                 990

Thr Asp Ser Asn Phe Tyr Arg Ala  Leu Met Asp Glu Glu  Asp Met Asp
        995                 1000                1005

Asp Val  Val Asp Ala Asp Glu  Tyr Leu Ile Pro Gln  Gln Gly Phe
    1010                1015                1020

Phe Ser  Ser Pro Ser Thr Ser  Arg Thr Pro Leu Leu  Ser Ser Leu
    1025                1030                1035

Ser Ala  Thr Ser Asn Asn Ser  Thr Val Ala Cys Ile  Asp Arg Asn
    1040                1045                1050

Gly Leu  Gln Ser Cys Pro Ile  Lys Glu Asp Ser Phe  Leu Gln Arg
    1055                1060                1065

Tyr Ser  Ser Asp Pro Thr Gly  Ala Leu Thr Glu Asp  Ser Ile Asp
    1070                1075                1080

Asp Thr  Phe Leu Pro Val Pro  Glu Tyr Ile Asn Gln  Ser Val Pro
    1085                1090                1095

Lys Arg  Pro Ala Gly Ser Val  Gln Asn Pro Val Tyr  His Asn Gln
    1100                1105                1110

Pro Leu  Asn Pro Ala Pro Ser  Arg Asp Pro His Tyr  Gln Asp Pro
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1115 1120 1125

His Ser Thr Ala Val Gly Asn Pro Glu Tyr Leu Asn Thr Val Gln
1130 1135 1140

Pro Thr Cys Val Asn Ser Thr Phe Asp Ser Pro Ala His Trp Ala
1145 1150 1155

Gln Lys Gly Ser His Gln Ile Ser Leu Asp Asn Pro Asp Tyr Gln
1160 1165 1170

Gln Asp Phe Phe Pro Lys Glu Ala Lys Pro Asn Gly Ile Phe Lys
1175 1180 1185

Gly Ser Thr Ala Glu Asn Ala Glu Tyr Leu Arg Val Ala Pro Gln
1190 1195 1200

Ser Ser Glu Phe Ile Gly Ala
1205 1210

<210> 36
<211> 1255
<212> PRT
<213> Homo sapiens

<400> 36

Met Glu Leu Ala Ala Leu Cys Arg Trp Gly Leu Leu Leu Ala Leu Leu
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Pro Pro Gly Ala Ala Ser Thr Gln Val Cys Thr Gly Thr Asp Met Lys
20 25 30

Leu Arg Leu Pro Ala Ser Pro Glu Thr His Leu Asp Met Leu Arg His
35 40 45

Leu Tyr Gln Gly Cys Gln Val Val Gln Gly Asn Leu Glu Leu Thr Tyr
50 55 60

Leu Pro Thr Asn Ala Ser Leu Ser Phe Leu Gln Asp Ile Gln Glu Val
65 70 75 80

Gln Gly Tyr Val Leu Ile Ala His Asn Gln Val Arg Gln Val Pro Leu
85 90 95

Gln Arg Leu Arg Ile Val Arg Gly Thr Gln Leu Phe Glu Asp Asn Tyr
100 105 110

Ala Leu Ala Val Leu Asp Asn Gly Asp Pro Leu Asn Asn Thr Thr Pro

115 120 125

Val Thr Gly Ala Ser Pro Gly Gly Leu Arg Glu Leu Gln Leu Arg Ser
130 135 140

Leu Thr Glu Ile Leu Lys Gly Gly Val Leu Ile Gln Arg Asn Pro Gln
145 150 155 160

Leu Cys Tyr Gln Asp Thr Ile Leu Trp Lys Asp Ile Phe His Lys Asn
165 170 175

Asn Gln Leu Ala Leu Thr Leu Ile Asp Thr Asn Arg Ser Arg Ala Cys
180 185 190

His Pro Cys Ser Pro Met Cys Lys Gly Ser Arg Cys Trp Gly Glu Ser
195 200 205

Ser Glu Asp Cys Gln Ser Leu Thr Arg Thr Val Cys Ala Gly Gly Cys
210 215 220

Ala Arg Cys Lys Gly Pro Leu Pro Thr Asp Cys Cys His Glu Gln Cys
225 230 235 240

Ala Ala Gly Cys Thr Gly Pro Lys His Ser Asp Cys Leu Ala Cys Leu
245 250 255

His Phe Asn His Ser Gly Ile Cys Glu Leu His Cys Pro Ala Leu Val
260 265 270

Thr Tyr Asn Thr Asp Thr Phe Glu Ser Met Pro Asn Pro Glu Gly Arg
275 280 285

Tyr Thr Phe Gly Ala Ser Cys Val Thr Ala Cys Pro Tyr Asn Tyr Leu
290 295 300

Ser Thr Asp Val Gly Ser Cys Thr Leu Val Cys Pro Leu His Asn Gln
305 310 315 320

Glu Val Thr Ala Glu Asp Gly Thr Gln Arg Cys Glu Lys Cys Ser Lys
325 330 335

Pro Cys Ala Arg Val Cys Tyr Gly Leu Gly Met Glu His Leu Arg Glu
340 345 350

Val Arg Ala Val Thr Ser Ala Asn Ile Gln Glu Phe Ala Gly Cys Lys
355 360 365

```
Lys Ile Phe Gly Ser Leu Ala Phe Leu Pro Glu Ser Phe Asp Gly Asp
    370                 375                 380

Pro Ala Ser Asn Thr Ala Pro Leu Gln Pro Glu Gln Leu Gln Val Phe
385                 390                 395                 400

Glu Thr Leu Glu Glu Ile Thr Gly Tyr Leu Tyr Ile Ser Ala Trp Pro
                405                 410                 415

Asp Ser Leu Pro Asp Leu Ser Val Phe Gln Asn Leu Gln Val Ile Arg
            420                 425                 430

Gly Arg Ile Leu His Asn Gly Ala Tyr Ser Leu Thr Leu Gln Gly Leu
        435                 440                 445

Gly Ile Ser Trp Leu Gly Leu Arg Ser Leu Arg Glu Leu Gly Ser Gly
    450                 455                 460

Leu Ala Leu Ile His His Asn Thr His Leu Cys Phe Val His Thr Val
465                 470                 475                 480

Pro Trp Asp Gln Leu Phe Arg Asn Pro His Gln Ala Leu Leu His Thr
                485                 490                 495

Ala Asn Arg Pro Glu Asp Glu Cys Val Gly Glu Gly Leu Ala Cys His
            500                 505                 510

Gln Leu Cys Ala Arg Gly His Cys Trp Gly Pro Gly Pro Thr Gln Cys
        515                 520                 525

Val Asn Cys Ser Gln Phe Leu Arg Gly Gln Glu Cys Val Glu Glu Cys
    530                 535                 540

Arg Val Leu Gln Gly Leu Pro Arg Glu Tyr Val Asn Ala Arg His Cys
545                 550                 555                 560

Leu Pro Cys His Pro Glu Cys Gln Pro Gln Asn Gly Ser Val Thr Cys
                565                 570                 575

Phe Gly Pro Glu Ala Asp Gln Cys Val Ala Cys Ala His Tyr Lys Asp
            580                 585                 590

Pro Pro Phe Cys Val Ala Arg Cys Pro Ser Gly Val Lys Pro Asp Leu
        595                 600                 605

Ser Tyr Met Pro Ile Trp Lys Phe Pro Asp Glu Glu Gly Ala Cys Gln
    610                 615                 620
```

```
Pro Cys Pro Ile Asn Cys Thr His Ser Cys Val Asp Leu Asp Asp Lys
625                 630                 635                 640

Gly Cys Pro Ala Glu Gln Arg Ala Ser Pro Leu Thr Ser Ile Ile Ser
                645                 650                 655

Ala Val Val Gly Ile Leu Leu Val Val Val Leu Gly Val Val Phe Gly
            660                 665                 670

Ile Leu Ile Lys Arg Arg Gln Gln Lys Ile Arg Lys Tyr Thr Met Arg
        675                 680                 685

Arg Leu Leu Gln Glu Thr Glu Leu Val Glu Pro Leu Thr Pro Ser Gly
    690                 695                 700

Ala Met Pro Asn Gln Ala Gln Met Arg Ile Leu Lys Glu Thr Glu Leu
705                 710                 715                 720

Arg Lys Val Lys Val Leu Gly Ser Gly Ala Phe Gly Thr Val Tyr Lys
                725                 730                 735

Gly Ile Trp Ile Pro Asp Gly Glu Asn Val Lys Ile Pro Val Ala Ile
            740                 745                 750

Lys Val Leu Arg Glu Asn Thr Ser Pro Lys Ala Asn Lys Glu Ile Leu
        755                 760                 765

Asp Glu Ala Tyr Val Met Ala Gly Val Gly Ser Pro Tyr Val Ser Arg
    770                 775                 780

Leu Leu Gly Ile Cys Leu Thr Ser Thr Val Gln Leu Val Thr Gln Leu
785                 790                 795                 800

Met Pro Tyr Gly Cys Leu Leu Asp His Val Arg Glu Asn Arg Gly Arg
                805                 810                 815

Leu Gly Ser Gln Asp Leu Leu Asn Trp Cys Met Gln Ile Ala Lys Gly
            820                 825                 830

Met Ser Tyr Leu Glu Asp Val Arg Leu Val His Arg Asp Leu Ala Ala
        835                 840                 845

Arg Asn Val Leu Val Lys Ser Pro Asn His Val Lys Ile Thr Asp Phe
    850                 855                 860

Gly Leu Ala Arg Leu Leu Asp Ile Asp Glu Thr Glu Tyr His Ala Asp
865                 870                 875                 880
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Gly Gly Lys Val Pro Ile Lys Trp Met Ala Leu Glu Ser Ile Leu Arg
                885                 890                 895

Arg Arg Phe Thr His Gln Ser Asp Val Trp Ser Tyr Gly Val Thr Val
            900                 905                 910

Trp Glu Leu Met Thr Phe Gly Ala Lys Pro Tyr Asp Gly Ile Pro Ala
        915                 920                 925

Arg Glu Ile Pro Asp Leu Leu Glu Lys Gly Glu Arg Leu Pro Gln Pro
    930                 935                 940

Pro Ile Cys Thr Ile Asp Val Tyr Met Ile Met Val Lys Cys Trp Met
945                 950                 955                 960

Ile Asp Ser Glu Cys Arg Pro Arg Phe Arg Glu Leu Val Ser Glu Phe
                965                 970                 975

Ser Arg Met Ala Arg Asp Pro Gln Arg Phe Val Val Ile Gln Asn Glu
            980                 985                 990

Asp Leu Gly Pro Ala Ser Pro Leu  Asp Ser Thr Phe Tyr  Arg Ser Leu
        995                 1000                1005

Leu Glu  Asp Asp Asp Met Gly  Asp Leu Val Asp Ala  Glu Glu Tyr
    1010                1015                1020

Leu Val  Pro Gln Gln Gly Phe  Phe Cys Pro Asp Pro  Ala Pro Gly
    1025                1030                1035

Ala Gly  Gly Met Val His His  Arg His Arg Ser Ser  Ser Thr Arg
    1040                1045                1050

Ser Gly  Gly Gly Asp Leu Thr  Leu Gly Leu Glu Pro  Ser Glu Glu
    1055                1060                1065

Glu Ala  Pro Arg Ser Pro Leu  Ala Pro Ser Glu Gly  Ala Gly Ser
    1070                1075                1080

Asp Val  Phe Asp Gly Asp Leu  Gly Met Gly Ala Ala  Lys Gly Leu
    1085                1090                1095

Gln Ser  Leu Pro Thr His Asp  Pro Ser Pro Leu Gln  Arg Tyr Ser
    1100                1105                1110

Glu Asp  Pro Thr Val Pro Leu  Pro Ser Glu Thr Asp  Gly Tyr Val
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1115 1120 1125

Ala Pro Leu Thr Cys Ser Pro Gln Pro Glu Tyr Val Asn Gln Pro
1130 1135 1140

Asp Val Arg Pro Gln Pro Pro Ser Pro Arg Glu Gly Pro Leu Pro
1145 1150 1155

Ala Ala Arg Pro Ala Gly Ala Thr Leu Glu Arg Ala Lys Thr Leu
1160 1165 1170

Ser Pro Gly Lys Asn Gly Val Val Lys Asp Val Phe Ala Phe Gly
1175 1180 1185

Gly Ala Val Glu Asn Pro Glu Tyr Leu Thr Pro Gln Gly Gly Ala
1190 1195 1200

Ala Pro Gln Pro His Pro Pro Pro Ala Phe Ser Pro Ala Phe Asp
1205 1210 1215

Asn Leu Tyr Tyr Trp Asp Gln Asp Pro Pro Glu Arg Gly Ala Pro
1220 1225 1230

Pro Ser Thr Phe Lys Gly Thr Pro Thr Ala Glu Asn Pro Glu Tyr
1235 1240 1245

Leu Gly Leu Asp Val Pro Val
1250 1255

<210> 37
<211> 1260
<212> PRT
<213> Rattus norvegicus

<400> 37

Met Ile Ile Met Glu Leu Ala Ala Trp Cys Arg Trp Gly Phe Leu Leu
1 5 10 15

Ala Leu Leu Pro Pro Gly Ile Ala Gly Thr Gln Val Cys Thr Gly Thr
20 25 30

Asp Met Lys Leu Arg Leu Pro Ala Ser Pro Glu Thr His Leu Asp Met
35 40 45

Leu Arg His Leu Tyr Gln Gly Cys Gln Val Val Gln Gly Asn Leu Glu
50 55 60

Leu Thr Tyr Val Pro Ala Asn Ala Ser Leu Ser Phe Leu Gln Asp Ile

65 70 75 80

Gln Glu Val Gln Gly Tyr Met Leu Ile Ala His Asn Gln Val Lys Arg
85 90 95

Val Pro Leu Gln Arg Leu Arg Ile Val Arg Gly Thr Gln Leu Phe Glu
100 105 110

Asp Lys Tyr Ala Leu Ala Val Leu Asp Asn Arg Asp Pro Gln Asp Asn
115 120 125

Val Ala Ala Ser Thr Pro Gly Arg Thr Pro Glu Gly Leu Arg Glu Leu
130 135 140

Gln Leu Arg Ser Leu Thr Glu Ile Leu Lys Gly Gly Val Leu Ile Arg
145 150 155 160

Gly Asn Pro Gln Leu Cys Tyr Gln Asp Met Val Leu Trp Lys Asp Val
165 170 175

Phe Arg Lys Asn Asn Gln Leu Ala Pro Val Asp Ile Asp Thr Asn Arg
180 185 190

Ser Arg Ala Cys Pro Pro Cys Ala Pro Ala Cys Lys Asp Asn His Cys
195 200 205

Trp Gly Glu Ser Pro Glu Asp Cys Gln Ile Leu Thr Gly Thr Ile Cys
210 215 220

Thr Ser Gly Cys Ala Arg Cys Lys Gly Arg Leu Pro Thr Asp Cys Cys
225 230 235 240

His Glu Gln Cys Ala Ala Gly Cys Thr Gly Pro Lys His Ser Asp Cys
245 250 255

Leu Ala Cys Leu His Phe Asn His Ser Gly Ile Cys Glu Leu His Cys
260 265 270

Pro Ala Leu Val Thr Tyr Asn Thr Asp Thr Phe Glu Ser Met His Asn
275 280 285

Pro Glu Gly Arg Tyr Thr Phe Gly Ala Ser Cys Val Thr Thr Cys Pro
290 295 300

Tyr Asn Tyr Leu Ser Thr Glu Val Gly Ser Cys Thr Leu Val Cys Pro
305 310 315 320

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Pro Asn Asn Gln Glu Val Thr Ala Glu Asp Gly Thr Gln Arg Cys Glu
                325                 330                 335

Lys Cys Ser Lys Pro Cys Ala Arg Val Cys Tyr Gly Leu Gly Met Glu
            340                 345                 350

His Leu Arg Gly Ala Arg Ala Ile Thr Ser Asp Asn Val Gln Glu Phe
        355                 360                 365

Asp Gly Cys Lys Lys Ile Phe Gly Ser Leu Ala Phe Leu Pro Glu Ser
    370                 375                 380

Phe Asp Gly Asp Pro Ser Ser Gly Ile Ala Pro Leu Arg Pro Glu Gln
385                 390                 395                 400

Leu Gln Val Phe Glu Thr Leu Glu Glu Ile Thr Gly Tyr Leu Tyr Ile
                405                 410                 415

Ser Ala Trp Pro Asp Ser Leu Arg Asp Leu Ser Val Phe Gln Asn Leu
            420                 425                 430

Arg Ile Ile Arg Gly Arg Ile Leu His Asp Gly Ala Tyr Ser Leu Thr
        435                 440                 445

Leu Gln Gly Leu Gly Ile His Ser Leu Gly Leu Arg Ser Leu Arg Glu
    450                 455                 460

Leu Gly Ser Gly Leu Ala Leu Ile His Arg Asn Ala His Leu Cys Phe
465                 470                 475                 480

Val His Thr Val Pro Trp Asp Gln Leu Phe Arg Asn Pro His Gln Ala
                485                 490                 495

Leu Leu His Ser Gly Asn Arg Pro Glu Glu Asp Leu Cys Val Ser Ser
            500                 505                 510

Gly Leu Val Cys Asn Ser Leu Cys Ala His Gly His Cys Trp Gly Pro
        515                 520                 525

Gly Pro Thr Gln Cys Val Asn Cys Ser His Phe Leu Arg Gly Gln Glu
    530                 535                 540

Cys Val Glu Glu Cys Arg Val Trp Lys Gly Leu Pro Arg Glu Tyr Val
545                 550                 555                 560

Ser Asp Lys Arg Cys Leu Pro Cys His Pro Glu Cys Gln Pro Gln Asn
                565                 570                 575
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Ser Ser Glu Thr Cys Phe Gly Ser Glu Ala Asp Gln Cys Ala Ala Cys
580 585 590

Ala His Tyr Lys Asp Ser Ser Ser Cys Val Ala Arg Cys Pro Ser Gly
595 600 605

Val Lys Pro Asp Leu Ser Tyr Met Pro Ile Trp Lys Tyr Pro Asp Glu
610 615 620

Glu Gly Ile Cys Gln Pro Cys Pro Ile Asn Cys Thr His Ser Cys Val
625 630 635 640

Asp Leu Asp Glu Arg Gly Cys Pro Ala Glu Gln Arg Ala Ser Pro Val
645 650 655

Thr Phe Ile Ile Ala Thr Val Glu Gly Val Leu Leu Phe Leu Ile Leu
660 665 670

Val Val Val Val Gly Ile Leu Ile Lys Arg Arg Arg Gln Lys Ile Arg
675 680 685

Lys Tyr Thr Met Arg Arg Leu Leu Gln Glu Thr Glu Leu Val Glu Pro
690 695 700

Leu Thr Pro Ser Gly Ala Met Pro Asn Gln Ala Gln Met Arg Ile Leu
705 710 715 720

Lys Glu Thr Glu Leu Arg Lys Val Lys Val Leu Gly Ser Gly Ala Phe
725 730 735

Gly Thr Val Tyr Lys Gly Ile Trp Ile Pro Asp Gly Glu Asn Val Lys
740 745 750

Ile Pro Val Ala Ile Lys Val Leu Arg Glu Asn Thr Ser Pro Lys Ala
755 760 765

Asn Lys Glu Ile Leu Asp Glu Ala Tyr Val Met Ala Gly Val Gly Ser
770 775 780

Pro Tyr Val Ser Arg Leu Leu Gly Ile Cys Leu Thr Ser Thr Val Gln
785 790 795 800

Leu Val Thr Gln Leu Met Pro Tyr Gly Cys Leu Leu Asp His Val Arg
805 810 815

Glu His Arg Gly Arg Leu Gly Ser Gln Asp Leu Leu Asn Trp Cys Val
820 825 830

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Gln Ile Ala Lys Gly Met Ser Tyr Leu Glu Asp Val Arg Leu Val His
        835                 840                 845

Arg Asp Leu Ala Ala Arg Asn Val Leu Val Lys Ser Pro Asn His Val
    850                 855                 860

Lys Ile Thr Asp Phe Gly Leu Ala Arg Leu Leu Asp Ile Asp Glu Thr
865                 870                 875                 880

Glu Tyr His Ala Asp Gly Gly Lys Val Pro Ile Lys Trp Met Ala Leu
                885                 890                 895

Glu Ser Ile Leu Arg Arg Arg Phe Thr His Gln Ser Asp Val Trp Ser
            900                 905                 910

Tyr Gly Val Thr Val Trp Glu Leu Met Thr Phe Gly Ala Lys Pro Tyr
        915                 920                 925

Asp Gly Ile Pro Ala Arg Glu Ile Pro Asp Leu Leu Glu Lys Gly Glu
    930                 935                 940

Arg Leu Pro Gln Pro Pro Ile Cys Thr Ile Asp Val Tyr Met Ile Met
945                 950                 955                 960

Val Lys Cys Trp Met Ile Asp Ser Glu Cys Arg Pro Arg Phe Arg Glu
                965                 970                 975

Leu Val Ser Glu Phe Ser Arg Met Ala Arg Asp Pro Gln Arg Phe Val
            980                 985                 990

Val Ile Gln Asn Glu Asp Leu Gly  Pro Ser Ser Pro Met  Asp Ser Thr
        995                 1000                1005

Phe Tyr  Arg Ser Leu Leu Glu  Asp Asp Asp Met Gly  Asp Leu Val
    1010                1015                1020

Asp Ala  Glu Glu Tyr Leu Val  Pro Gln Gln Gly Phe  Phe Ser Pro
    1025                1030                1035

Asp Pro  Thr Pro Gly Thr Gly  Ser Thr Ala His Arg  Arg His Arg
    1040                1045                1050

Ser Ser  Ser Thr Arg Ser Gly  Gly Gly Glu Leu Thr  Leu Gly Leu
    1055                1060                1065

Glu Pro  Ser Glu Glu Gly Pro  Pro Arg Ser Pro Leu  Ala Pro Ser
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1070 1075 1080

Glu Gly Ala Gly Ser Asp Val Phe Asp Gly Asp Leu Ala Met Gly
1085 1090 1095

Val Thr Lys Gly Leu Gln Ser Leu Ser Pro His Asp Leu Ser Pro
1100 1105 1110

Leu Gln Arg Tyr Ser Glu Asp Pro Thr Leu Pro Leu Pro Pro Glu
1115 1120 1125

Thr Asp Gly Tyr Val Ala Pro Leu Ala Cys Ser Pro Gln Pro Glu
1130 1135 1140

Tyr Val Asn Gln Ser Glu Val Gln Pro Gln Pro Pro Leu Thr Pro
1145 1150 1155

Glu Gly Pro Leu Pro Pro Val Arg Pro Ala Gly Ala Thr Leu Glu
1160 1165 1170

Arg Pro Lys Thr Leu Ser Pro Gly Lys Asn Gly Val Val Lys Asp
1175 1180 1185

Val Phe Ala Phe Gly Gly Ala Val Glu Asn Pro Glu Tyr Leu Val
1190 1195 1200

Pro Arg Glu Gly Thr Ala Ser Pro Pro His Pro Ser Pro Ala Phe
1205 1210 1215

Ser Pro Ala Phe Asp Asn Leu Tyr Tyr Trp Asp Gln Asn Ser Ser
1220 1225 1230

Glu Gln Gly Pro Pro Pro Ser Asn Phe Glu Gly Thr Pro Thr Ala
1235 1240 1245

Glu Asn Pro Glu Tyr Leu Gly Leu Asp Val Pro Val
1250 1255 1260